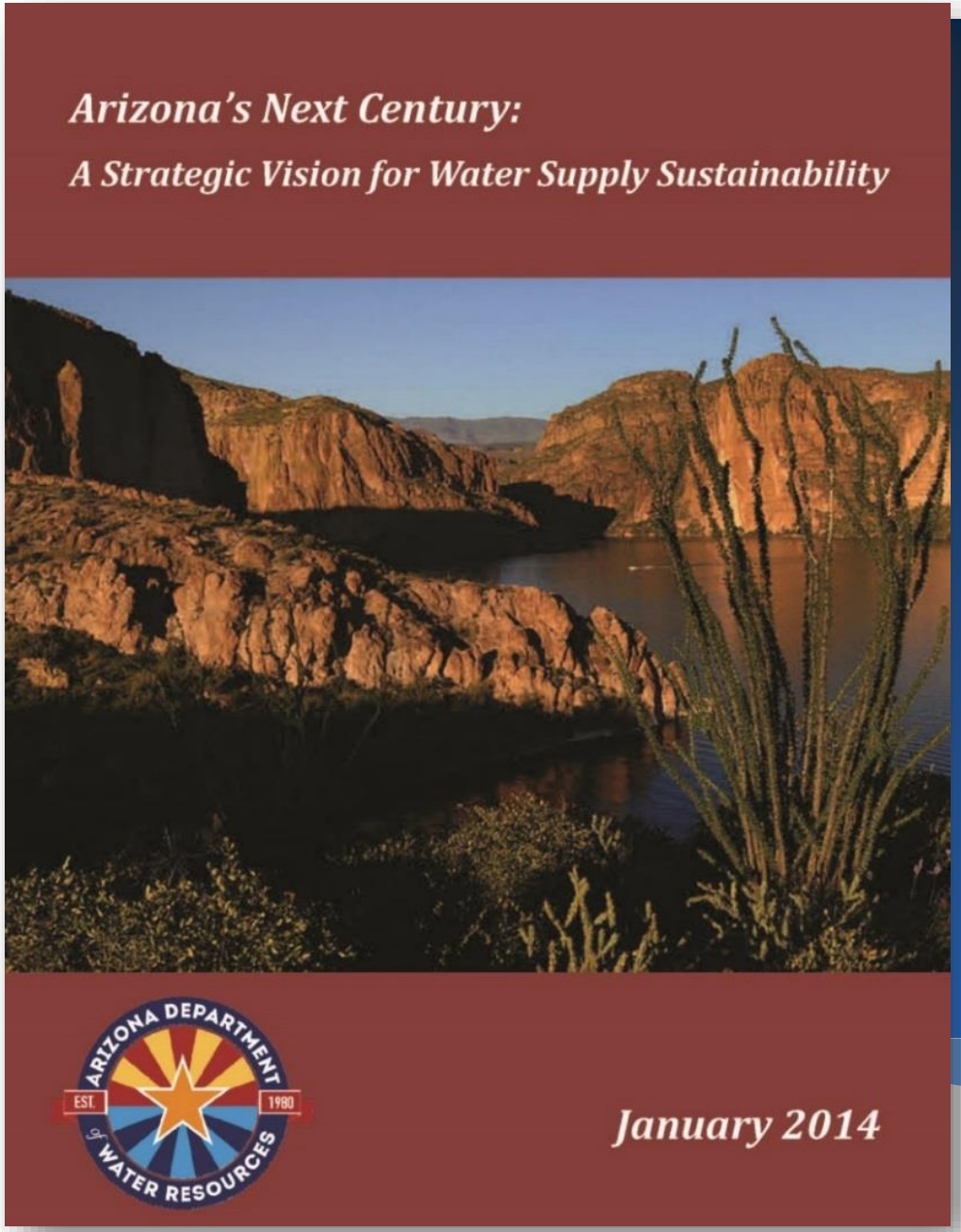
Northwest Basins Planning Area Information Update

Northwest Basins Planning Area
Stakeholders Meeting
May 18, 2017

John Riggins Water Resource Specialist
Arizona Department of Water Resources

PROTECTING
ARIZONA'S WATER SUPPLIES
for ITS NEXT CENTURY



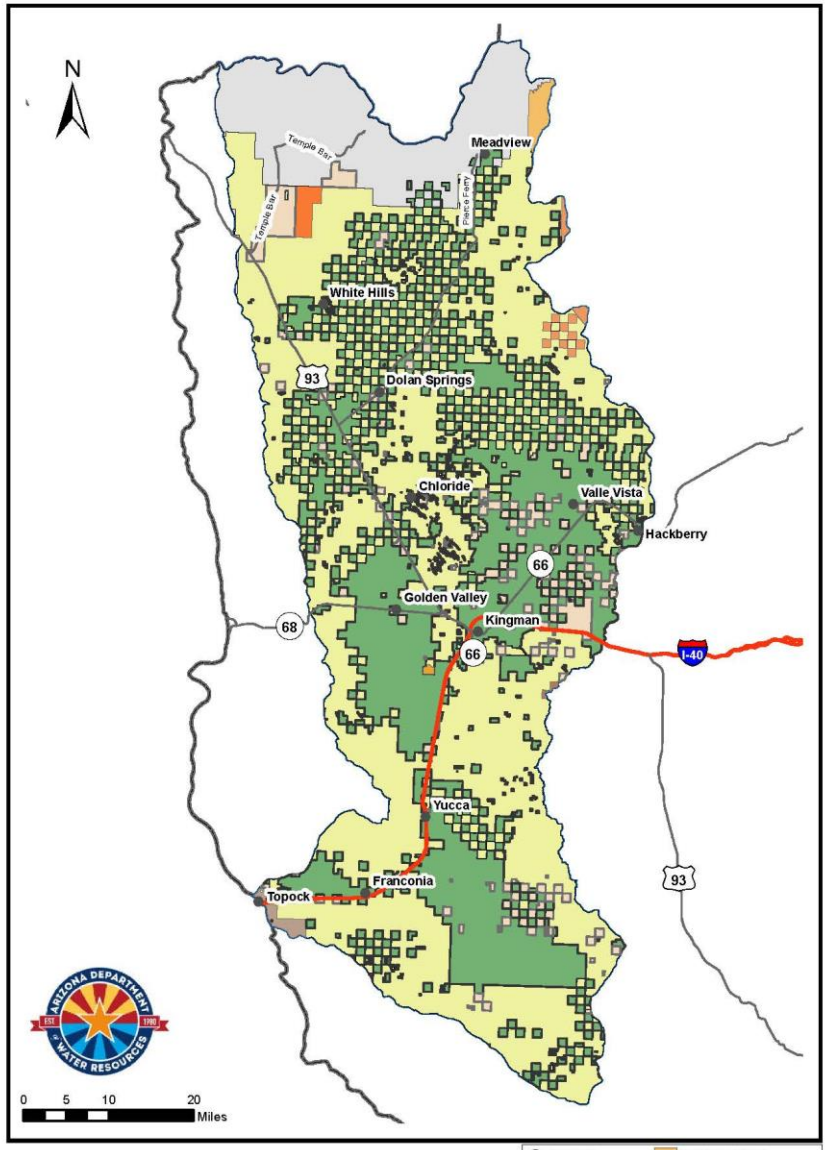
Northwest Basins Planning Area Information Updates

- **Updates to the Strategic Vision Data for the Northwest Basins Planning Area**
- **Updates based on stakeholder feedback and ADWR research in the Northwest Basins Planning Area**
- **Stakeholder suggestions were provided by:**
  - Meeting comments & questions
  - Emails & phone calls

Northwest Basins Information Update Summary

* A goal of this Planning Area process has been to update the data available to ADWR for the Northwest Basins Planning Area
* These updates were largely achieved by receiving input from you, the stakeholders regarding:
  * **Planning Area Background Info**
  * **Water Supply Conditions**
    * **Groundwater/Surface/Reclaimed/Ecological**
  * **Current and Projected Water Demands**
    * **Municipal/Industrial/Agricultural**
  * **Characteristics Affecting Future Demands and Water Supply Availability**
  * **Strategies for Meeting Future Water Demands**

Background Information: Land Ownership



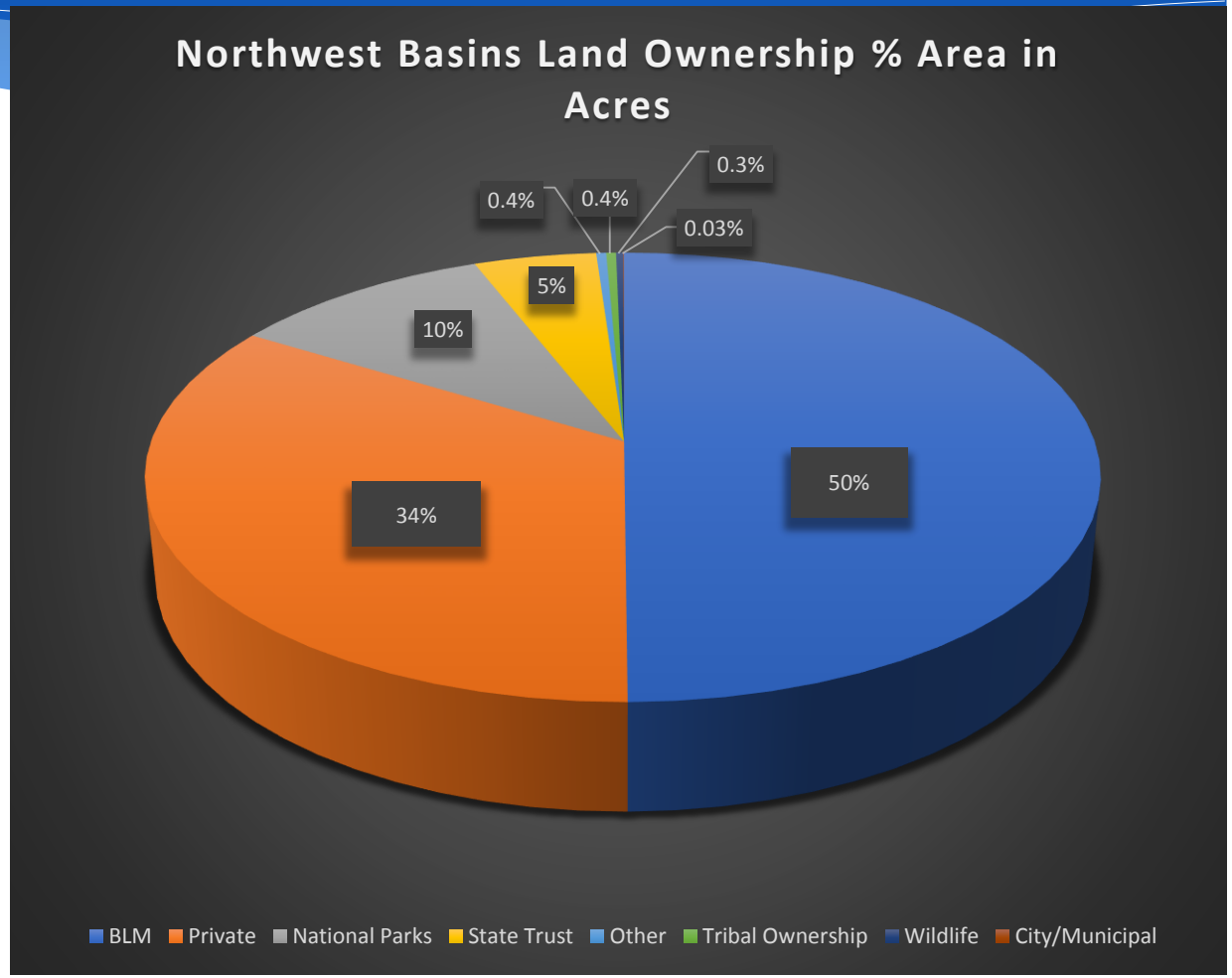
Northwest Basins Planning Area Land Ownership

- **Updates to the Background Information include but are not limited to:**
  - Land ownership updates will include:
    - Federal land largest percentage of land ownership
    - Specifics of land ownership by groundwater basin
    - "Checkerboard" land ownership in the Hualapai Basin identified by a stakeholder as being a characteristic that impedes potential future development which could increase the groundwater demand in the basin
  - Size of the Planning Area: 3,882 square miles (29% of Mohave County land area)

Land Ownership data updated May 30, 2014. Source: Arizona State Land Department, Arizona Land Resource Information System

Background Information: Total Land Ownership

Northwest Basins Land Ownership	Acres	Percentage of Ownership
BLM	1,239,728	50%
Private	842,001	34%
National Parks	255,954	10%
State Trust	119,764	5%
Other	9,693	0.4%
Tribal Ownership	9,609	0.4%
Wildlife	7,003	0.3%
City/Municipal	779	0.03%
Total	**2,484,530**	**100%**

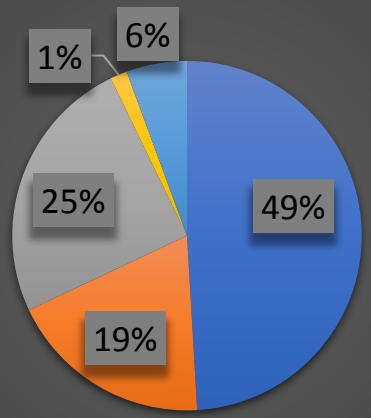


Land Ownership data updated May 30, 2014. Source: Arizona State Land Department, Arizona Land Resource Information System

Background Information: Land Ownership by Groundwater Basin

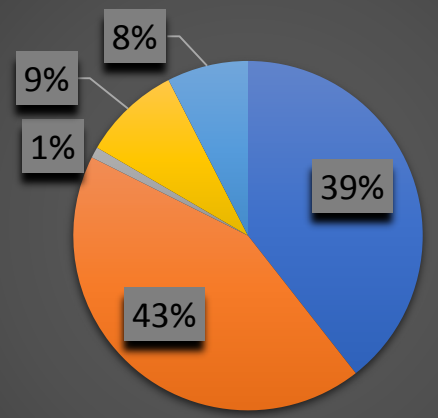
Groundwater Basin	Land Ownership	Acreage	Percentage
Hualapai Basin	BLM	305,932	39%
	Private	333,453	43%
	Tribal	7,823	1%
	National Park	70,486	9%
	State Trust	58,323	8%
	Total	**776,017**	
Detrital Basin	BLM	280,175	49%
	Private	108,047	19%
	National Park	141,718	25%
	Other	8,962	2%
	State Trust	32,054	6%
	Total	**570,956**	
Meadview Basin	BLM	57,903	48%
	Tribal	1,747	1%
	National Park	43,766	36%
	Private	17,949	15%
	State Trust	319	0%
	Total	**121,684**	
Sacramento Basin	BLM	595,706	59%
	City/County Park	778	0%
	Other	771	0%
	Private	382,551	38%
	State Trust	29,066	3%
	Wildlife	7,002	1%
	Total	**1,015,874**	

Detrital Basin Land Ownership



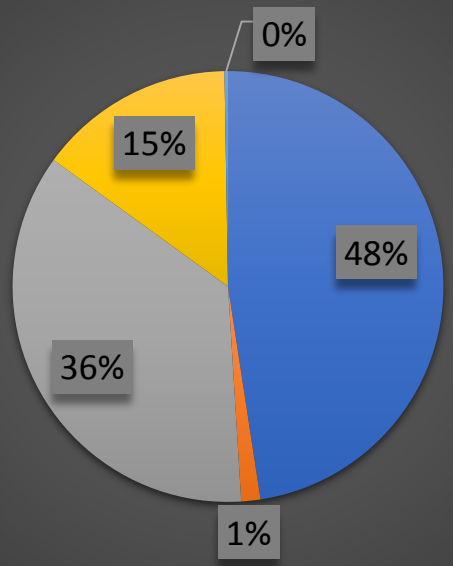
BLM Private National Park Other State Trust

Hualapai Basin Land Ownership



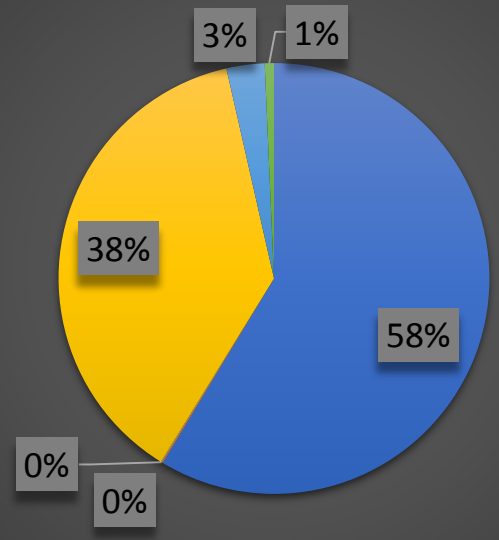
BLM Private Tribal National Park State Trust

Meadview Basin Land Ownership



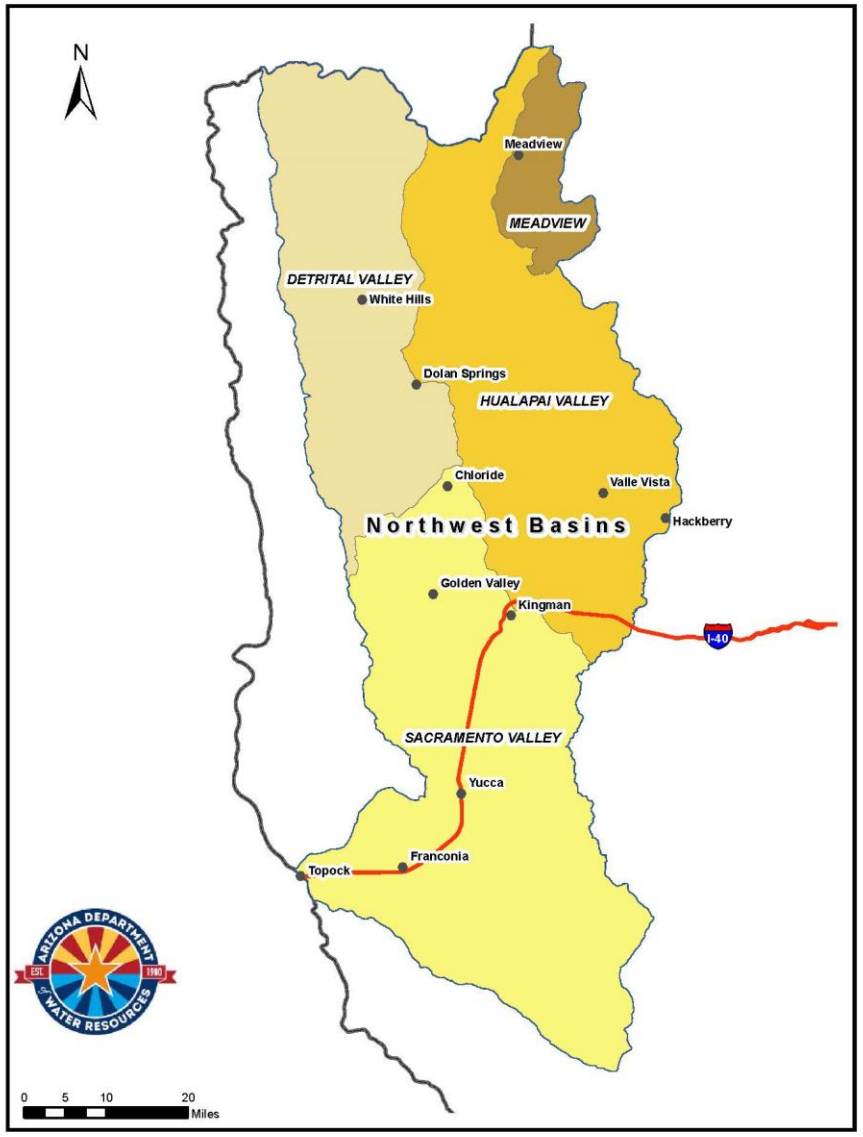
BLM Tribal National Park Private State Trust

Sacramento Basin Land Ownership



BLM City/County Park Other Private State Trust Wildlife

Background Information Update: Water Supply Conditions

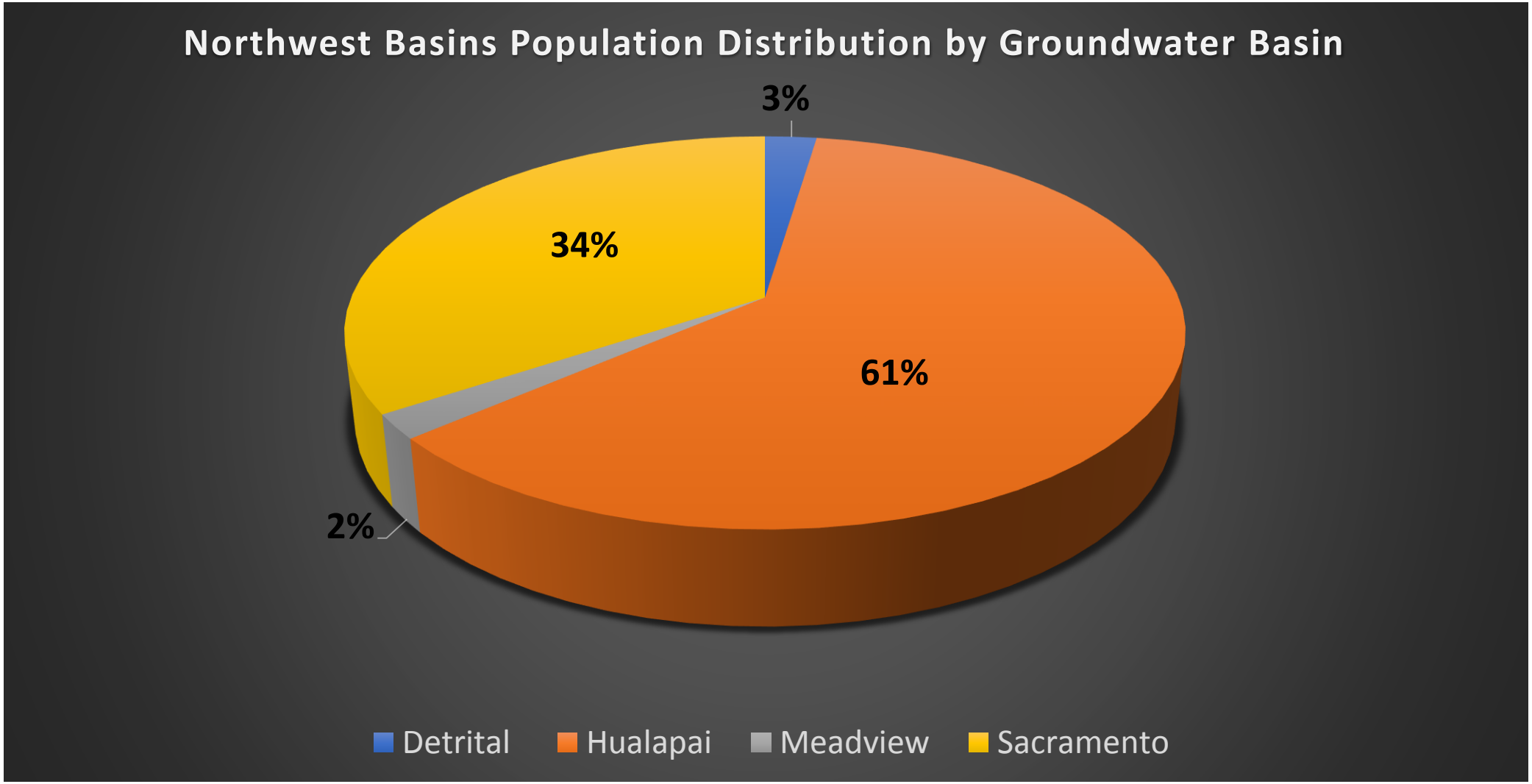


Northwest Basins Planning Area Groundwater Basins

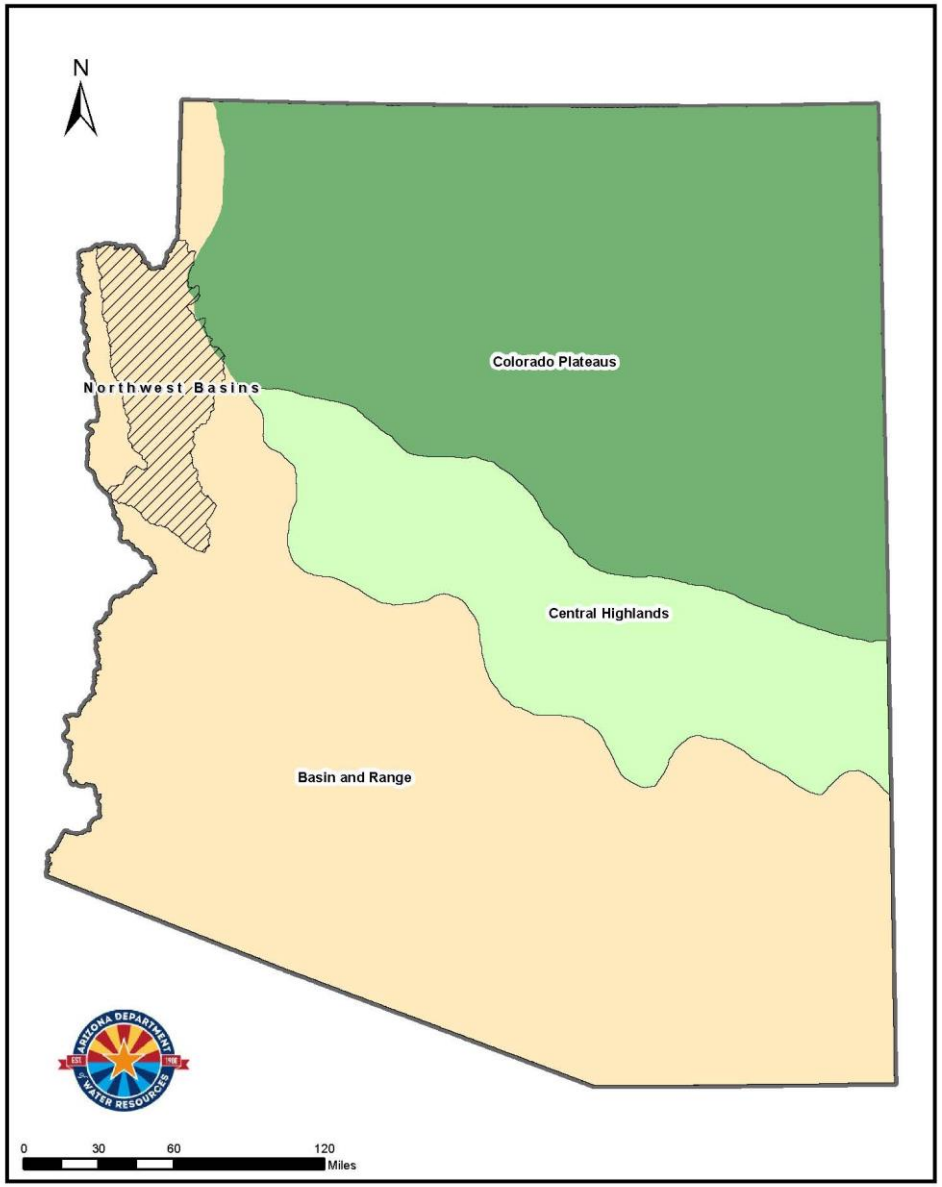
* **Groundwater Basins Details**
  - Basins Spatial Details:
    - Detrital, Hualapai, Meadview & Sacramento
    - Size of the groundwater basins
      - **Detrital:** 892 square-miles
      - **Hualapai:** 1,213 square-miles
      - **Meadview:** 190 square-miles
      - **Sacramento:** 1,587 square-miles
    - Population Centers Include:
      - City of Kingman
        - Planning Area's largest incorporated community at 29,063 people[1] & 35.3 square-miles[2]
      - Unincorporated communities include:
        - Valle Vista, Golden Valley, Dolan Springs, Yucca and others.

[1]Arizona Office of Economic Opportunity, Arizona Population Estimate July 1, 2016 https://population.az.gov/
[2]City of Kingman

Background Information Update: Water Supply Conditions



Arizona Office of Economic Opportunity Population Projection Estimates:
https://population.az.gov/population-projections



Northwest Basins Planning Area
Physiographic Province

Water Supply Conditions

- **Basins & Range Physiographic Province**
- Bordered by the Colorado Plateau to the east and the first range in the Basin and Range Province, Cerbat Mountains[1]
- Groundwater
  - Leading source in Planning Area
- Surface Water
  - Colorado River
- Reclaimed Water
  - City of Kingman Hilltop WWTP

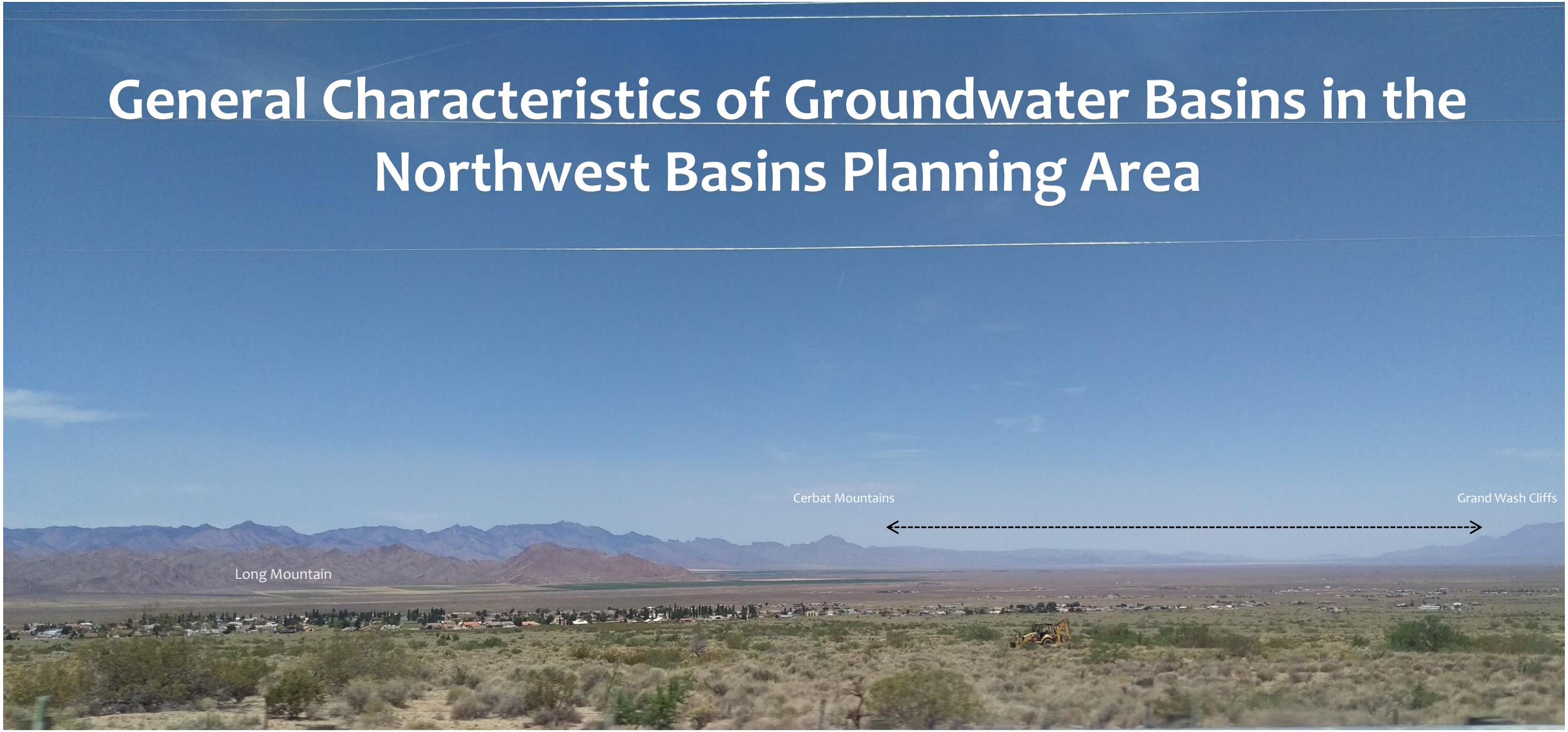
1 Red Lake Salt Mass by H. Wesley Peirce; Arizona Bureau of Mines March 1972

Basin and Range Topography

* Northwesterly elongated valleys
* Long broad alluvial valleys
* Deep productive regional alluvial aquifers
* Was identified that the Planning Area may provide opportunities for artificial storage and recovery [1]

[1] A Strategic Vision for Water Supply Sustainability; Northwest Basins Planning Area; January 2014; page P.A. 15-1

General Characteristics of Groundwater Basins in the Northwest Basins Planning Area

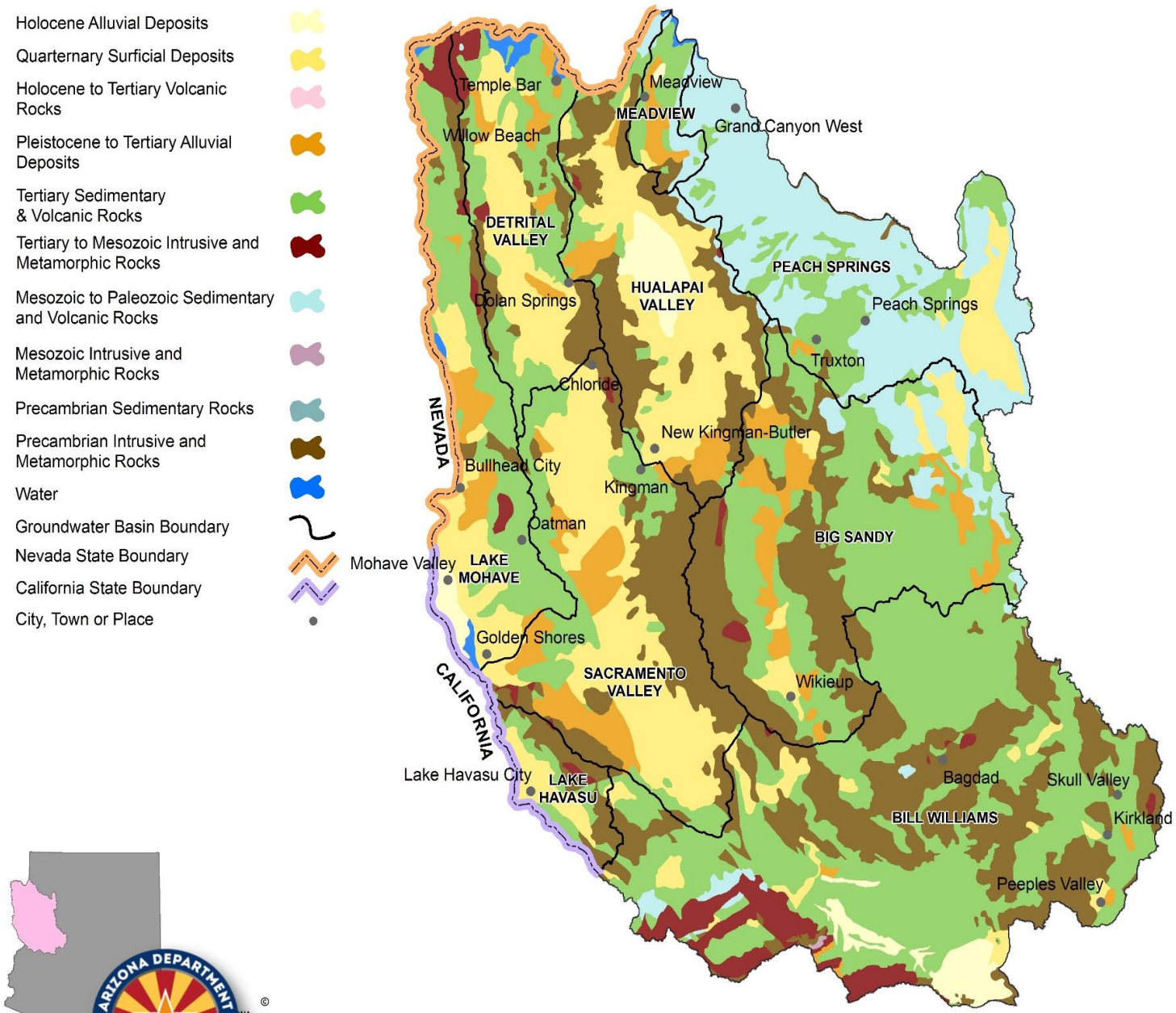


Long, broad alluvial valleys separated by mountain ranges

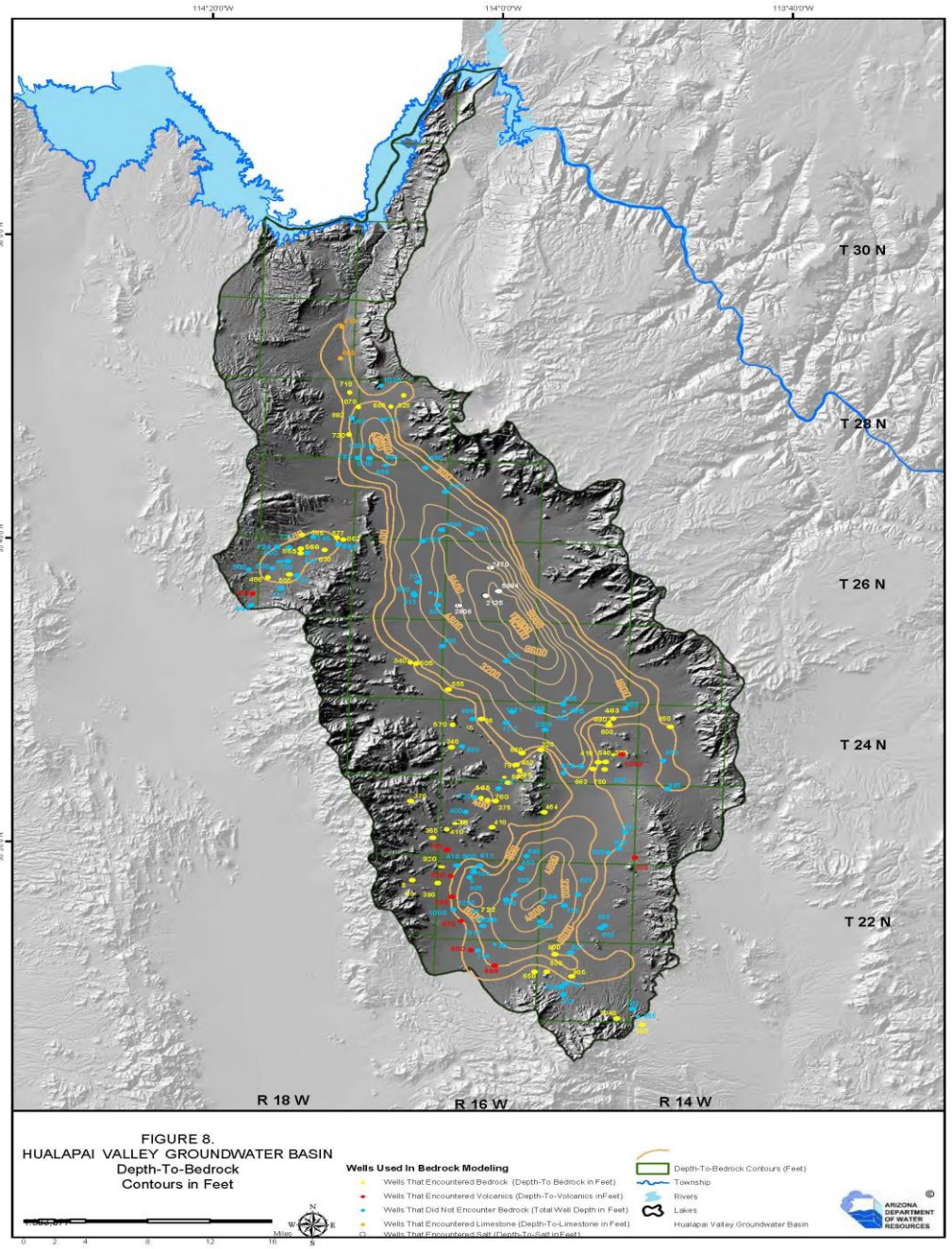
Hualapai Groundwater Basin looking north towards Valle Vista

Alluvial Basin Aquifer Characteristics

* Hydrologic & Geologic Characteristics:
  * These basins contain extensive areas of basin fill deposits which comprise the primary groundwater aquifers
  * The oldest layers of bedrock are the result of faulting which over time becomes layered with basin fill
  * Outcrops of sedimentary and volcanic rocks of varying ages



Source: ADWR Surface Geology of the Upper Colorado River Planning Area (pre-dates Northwest Basins Planning Area



25 Preliminary Estimate of Groundwater in Storage for the Hualapai Valley GroundwaterBasin

Alluvial Basin Aquifer Characteristics Salt Deposits

- The Hualapai Valley Groundwater Basin contains a large salt deposit (Red Lake area)
- This deposit has been called one of the thickest non-marine halite deposits known (Faulds et al., 1997). [1]
- 4 exploratory wells (noted on map) encountered salt deposits to a depth indicated on the map marker.
  - Salt struck at approx.: (2,608), (2,135), (5,994), (2,470) feet respectively[1]
- A 1981 USGS study used gravity data to estimate the extent of the Red Lake salt body to be as much as 5 mi (8 km) wide, 12 mi (19 km) long, and 6,000 ft. (1830 m) thick. [2]
- Additional Source:
  - Red Lake Salt Mass by H. Wesley Peirce March 1972 [3]

1 Arizona Department of Water Resources Hydrology Division; September 2009; Preliminary Estimate of Groundwater in Storage for the Hualapai Valley Groundwater Basin Mohave County, Arizona Open File Report Number 11; Ivanich, Paul A., Conway, Brian D., Page 12 & 25

2 Bouguer Gravity Map of Hualapai Valley Mohave County, Arizona; Davis, W.E., Conradi, Arthur,Jr., Open File Report 81-770; United States Department of the Interior Geological Survey 1981

3 Red Lake Salt Mass; Arizona Bureau of Mines; Peirce, Wesley,H., March 1972

General Characteristics of Groundwater Basins in the Northwest Basins Planning Area

Estimated Groundwater Storage & Natural Recharge

Basin Characteristic	Unit	Detrital Valley	Sacramento Valley	Hualapai Valley	Meadview
Estimated GW Storage [1]	Acre-Feet	7,900,000	28,000,000	11,400,000	<1,000,000
Storage Estimates Upper & Lower Boundaries[1]	Million Acre-Feet	.81 to 15.7 MAF	17.6 to 30.3 MAF	5.5 to 17.3 MAF	NA
Estimated Natural Recharge [2]	Acre-Feet/Year	< 1,500	6,000	5,400	NA

[1] Detrital Valley, Sacramento Valley and Hualapai Valley groundwater storage estimates from USGS SIR 2012-5275. Estimates are to a depth of 400 meters (≈1,300 feet below land surface). Groundwater in storage estimates have upper and lower boundaries of .81 to 15.7 MAF, 17.6 to 30.3 MAF and 5.5 to 17.3 MAF; for the Detrital Valley, Sacramento Valley and Hualapai Valley basins, respectively. Meadview groundwater storage estimate from Arizona Water Commission 1975.

Note: Not all groundwater In storage Is practically recoverable For hydro-geologic, technical, economic or other reasons.

[2] Detrital, Sacramento and Hualapai natural recharge estimates from USGS SIR 2013-5122.

Water Supply Conditions: Surface Water

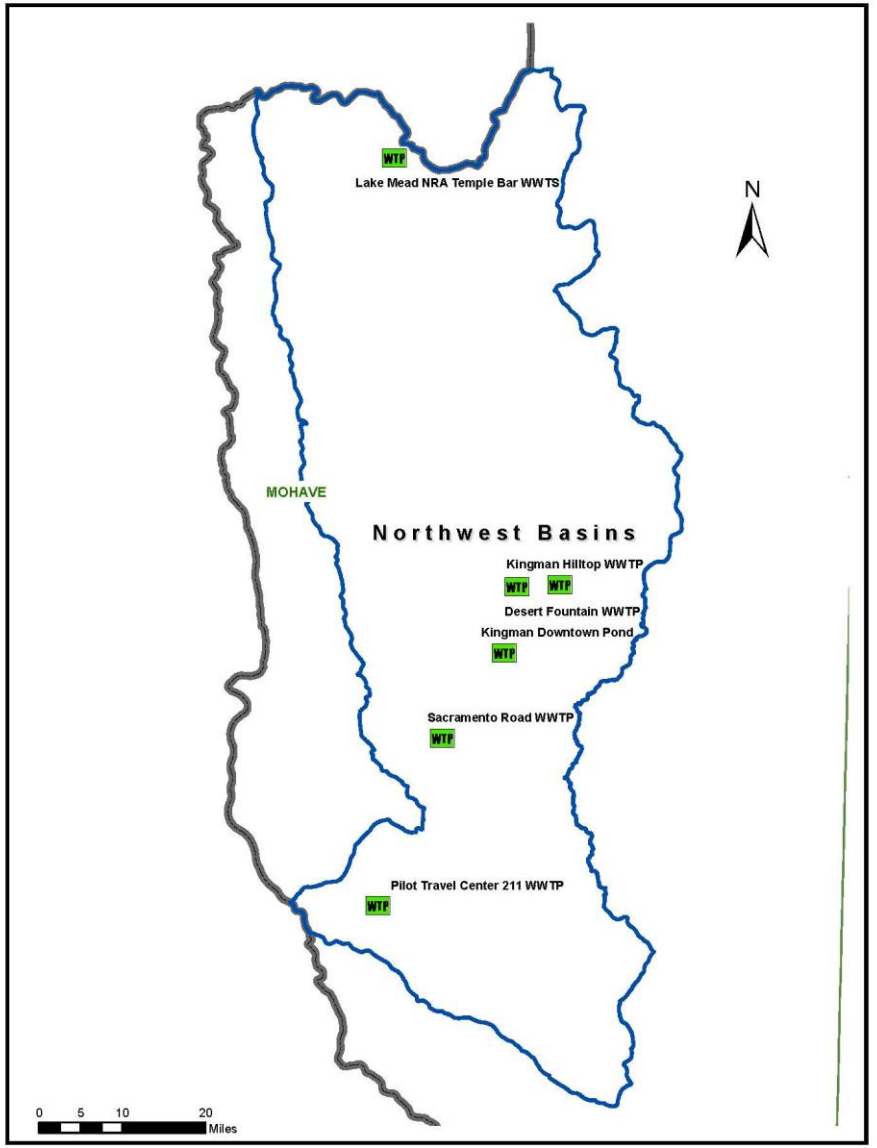
* The Northwest Basins primary water source is groundwater
* Other than the Colorado River, no perennial streams in the Planning Area
* Only two Colorado River allotments in the Planning Area:

1. **Lake Mead National Recreation Area**
   * Northern boundary of the Planning Area (see map)
   * Lake Mead N.R.A. has a 2nd Priority Entitlement to Colorado River water[1]
2. **Havasu National Wildlife Refuge**
   * Havasu National Wildlife Refuge has 2nd priority entitlement to Colorado River water[1]
   * 4.5 miles along the western border with California near Topock, AZ.

[1] Arizona Colorado River Water Use Present Perfected Right Holder & Contractors Listed Alphabetically; ADWR

Water Supply Conditions: Reclaimed Water

- **City of Kingman Wastewater Treatment Facilities:**
  - Downtown Plant: Treats 300,000 gallons per day[1]
  - Hilltop Plant: Treats 1,650,000 gallons per day[1]
  - Both systems serve approximately 21,000 people[1]
- **Other Planning Area Wastewater Treatment Facilities:**
  - Pilot Travel Center 211 WWTP Franconia, AZ
  - Sacramento Road WWTP 350,000 gallons per day[2]



Northwest Basins Planning Area
Wastewater Treatment Plants/Systems

Source: ADEQ & EPA updated June 4, 2014

[1] City of Kingman Wastewater Department, Public Works. http://www.cityofkingman.gov/Departments/PublicWorks/Wastewater.aspx

[2] Valentine Environmental Engineers; http://valentineengineers.com/water_resource/services-projects/reclaimed-water-systems/kingman-wwtp-expansion/

Ecological Resources Update

* **Lake Mead National Recreation Area** (National Park Service)
* **Havasu National Wildlife Refuge** (U.S. Fish & Wildlife Service)
* **Grand Canyon National Park** (National Park Service)
* **Designated Wilderness Areas** (1964 Wilderness Act areas)
  * Mt. Tipton
  * Mt. Wilson
  * Warm Springs
  * Wabayuma Peak
  * Aubrey Peak
    * These Wilderness areas managed by the Bureau of Land Management (BLM)
* **Arizona Important Bird Areas Program (IBA)**[1]
  * Havasu National Wildlife Refuge IBA
    * Along the Colorado River near Topock, Arizona
  * Joshua Tree IBA (Southern Sacramento Basin)

[1] Arizona Important Bird Area Program

Water Demand Updates

* Updates to Strategic Vision Water Demand excerpts:
  * *"Agricultural land uses within the Planning Area are very limited"*[1]
    * This has been updated as a new and unforeseen water demand sector (*Agricultural Water Sector*)
    * New Agricultural Water Demands (USGS Crop Survey Data) to be included in the updated Water Demand Tables
  * *"Several large master planned developments have been proposed in the northern portions of the Detrital and Hualapai Valleys. Recent economic downturns in the real estate sector have placed these development plans on hold."*[1]
    * Many of the properties have reportedly been converted to agriculture acreage.

*Farming near Red Lake, Hualapai Basin, AZ

[1]Northwest Basins Planning Area, Arizona's Next Century: A Strategic Vision for Water Supply Sustainability" page P.A. 15-2

Water Demand Updates Continued…

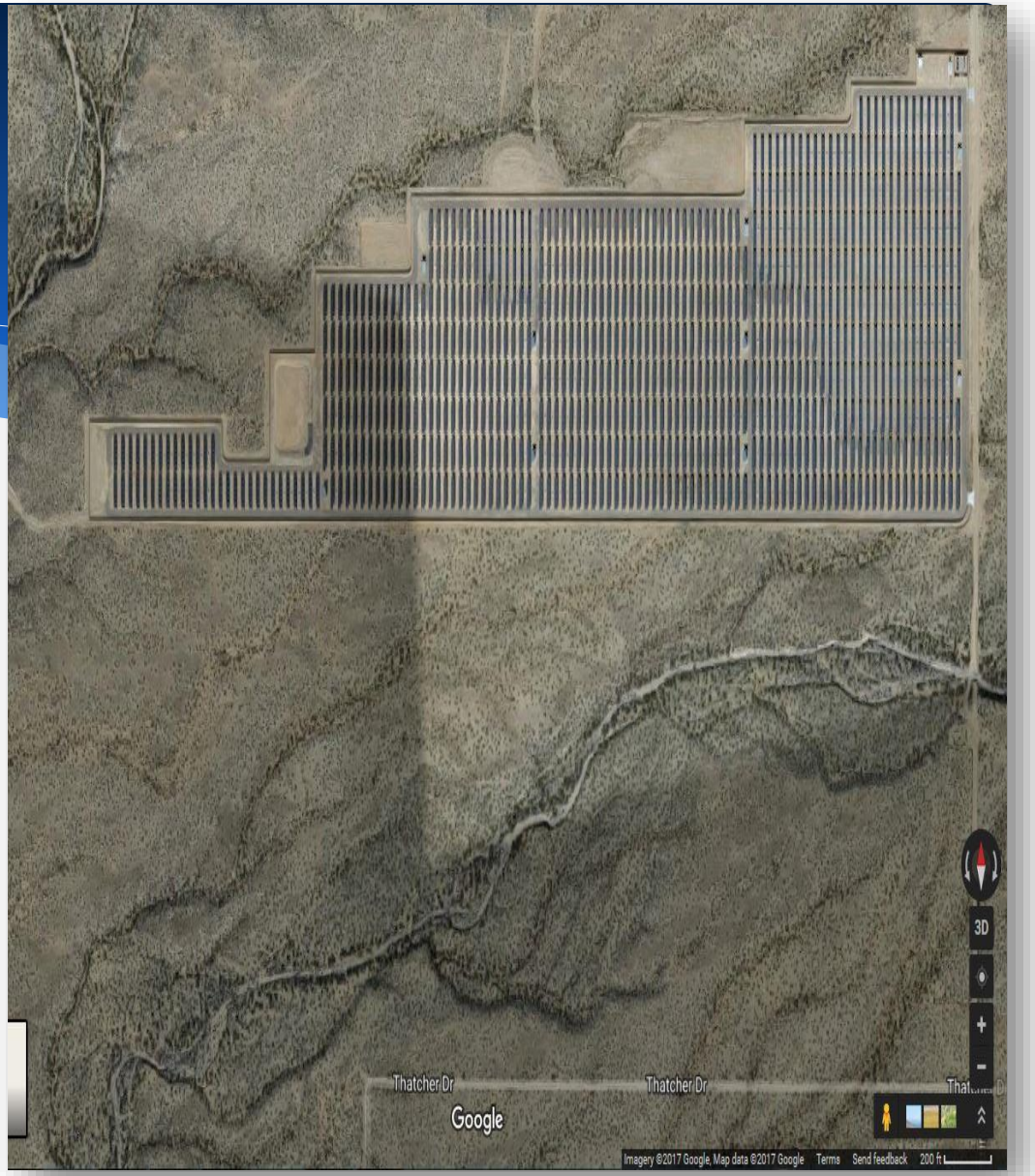
- "The largest potential for growth is in the municipal, mining and electrical power generating sectors"[1]
  - Updates to this comment will include but are not limited to:
    - Updated Municipal population estimations, projections and water demands
    - Reduction in mining industrial water demand after the closure of large mining operations in the Sacramento Basin
    - This updated mining number will include reported water deliveries and usage
    - New water demands reported to ADWR by the Griffith Power Station
    - Industrial demands will include a more detailed water use estimate for additional water users within the Planning Area

[1]"Northwest Basins Planning Area, Arizona's Next Century: A Strategic Vision for Water Supply Sustainability" page P.A. 15-2

Griffith Energy Plant, Sacramento Basin, AZ

Water Demand Updates Continued…

* "Because of the extensive availability of BLM lands, it is anticipated that this area may be a focus for expansion of renewable energy development in the future."[1]
  * **Updated renewable energy for the Planning Area will include:**
    * BP Wind was pursuing the development of a wind farm north of Kingman[2] in 2015 sold to Orion Renewable Energy Group LLC
    * Orion Renewable Energy Group LLC currently has no projects listed online for the state of Arizona[3]
  * **Black Mountain Solar Power in Sacramento Basin** (est. 2012)
    * Photovoltaic (PV) plant reports a very small water footprint (.05 AF/Year)
  * **Western Wind Energy** located in the Sacramento Basin (southwestern portion of Kingman, AZ & est. 2011)
    * Combined wind/solar energy farm[4]
  * **Solar Panels near Kingman High School on Gordon Dr.**
    * 1.22-megawatt PV system (7 acres)
  * **Steven H. Jacobson Solar Facility**
    * 5 megawatt system comprised of 15,000 photovoltaic panels (32 acres)[5]



*Black Mountain Solar

[1]Northwest Basins Planning Area, Arizona's Next Century: A Strategic Vision for Water Supply Sustainability" page P.A. 15-2
[2]Bullhead City Bee; May 29, 2015; Hawkins, D., http://bullheadcitybee.us/news-stories-archived/massive-wind-farm-near-kingman-changes-ownership/
[3] Orion Renewable Energy Group LLC; http://orionrenewables.com/projects/
[4]http://www.mohavedevelopment.org/majorindustries/western-wind-energy/
[5]UniSource Energy Services, Press Releases, Renewable Energy April 2017, **Steven H. Jacobson Solar Facility ;** https://www.uesaz.com/news/ues-dedicates-new-solar-facility-in-honor-of-longtime-mohave-county-employee/

Water Management Updates

* The Planning Area is not within an AMA or INA that requires reporting of water usage
* Updated sources of water demand for the Planning Area:
  * Community Water Systems Annual Reporting
  * Arizona Corporation Commission Annual Reporting
  * Municipal Water System Utility Reports
  * Reported Industrial water demands
  * Comparative data from reported values within the AMAs (approximations using metered values)
  * Organizations, businesses, local officials and others offered their respective annual water uses.
  * Upcoming well sweep by ADWR (Fall 2017)

GWSI Automated Well in the Hualapai Basin

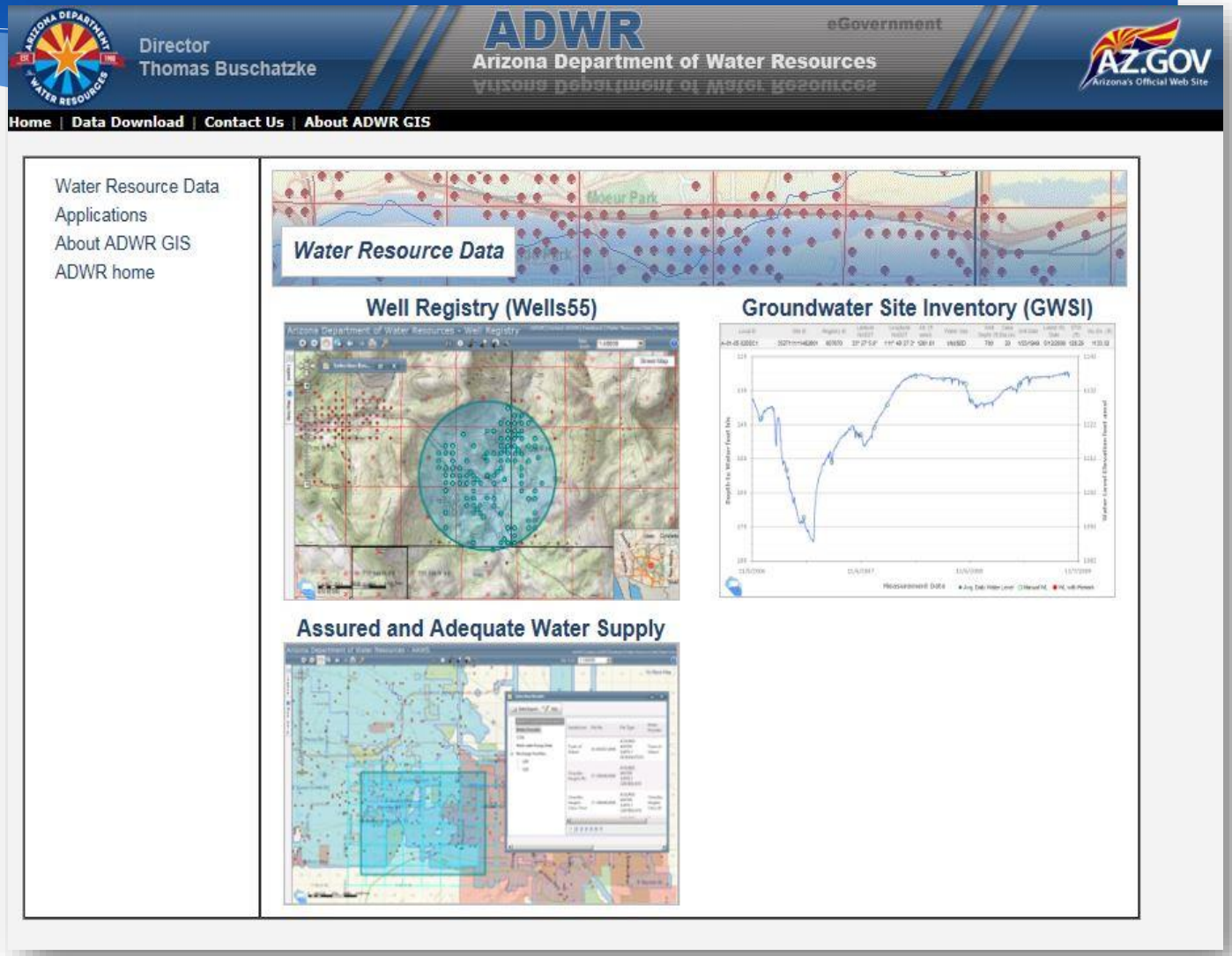
Water Management Updates

* Mohave County Water Authority (MCWA)
  * Established in 1995
  * A.R.S 45-2201 is legislation created to assume assignment of the Kingman Colorado River Contract
  * This was in exchange for funds provided to the City of Kingman to develop groundwater resources
  * Comprised of representatives from Lake Havasu City, Bullhead City, City of Kingman (Mayor Gates), Mohave Valley Irrigation & Drainage District, Mohave County Board of Supervisors, Mohave Water Conservation District, Golden Shores Water Conservation District

Information Source: Mohave County Water Authority

Updates for Strategies for Meeting Future Water Demands: Groundwater

1. Continued to add hydrologic monitoring of wells volunteered by stakeholders to the Groundwater Site Inventory (GWSI)
2. ADWR Hydrology will conduct a Water Level Survey of the Planning Area this Fall (2017)
3. Contracted with U.S. Geologic Survey to conduct crop survey analysis of the Hualapai & Sacramento Groundwater Basins
4. Water demand has and will continue to be updated for Planning Area through this process
5. Education provided to stakeholders (including elected officials) regarding the options in statute for groundwater management in areas outside of AMAs and INAs



Updates for Strategies for Meeting Future Water Demands: Reclaimed Water Reuse

* From the Strategic Vision for Water Supply Sustainability:
  * *"Potential exists to meet the expanded needs of this community and to provide opportunities for permitted recharge to augment aquifer water supplies, as well as direct uses for landscape watering, golf course irrigation and industrial process and cooling."*
    * Stakeholders were given a presentation on Arizona's Recharge Program
  * *"The plants (two wastewater treatment plants) are currently operating at about half of their treatment capacity (approximately 2,000 acre-feet annually). – Current referring to 2014*
    * The City recognizes the potential for additional effluent use within the city


Questions?